

REMARKS

Claims 1-2, and 4 are pending. Claims 1-2, and 4 have been amended.

Claim 3 has been canceled. No new matter has been introduced. Reexamination and reconsideration of the application is respectfully requested.

An Information Disclosure Statement is being filed concurrently herewith.

In the May 22, 2003 Office Action, the Examiner rejected claims 1-4 under 35 U.S.C. §102(b) as being anticipated by Bonneville, U.S. Patent No. 5,729,611 (hereinafter the Bonneville reference). Dependent claim 3 has been canceled. This rejection is respectfully traversed.

Amended Independent claim 1 recites:

An audio apparatus for use in a negative impedance drive of a loudspeaker having an internal impedance to perform a desired amplitude-frequency characteristic, comprising:

an amplifier device that drives the loudspeaker with a driving voltage;

a providing section that provides a control voltage corresponding to a level of the driving voltage of the loudspeaker; and

a feedback device having a variable feedback gain that performs a positive feedback of a signal corresponding to the driving voltage of the loudspeaker to an input of the amplifier device thereby causing the amplifier device to generate a negative impedance effective to negate the internal impedance of the loudspeaker, the feedback device comprising a voltage-controlled amplifier having the variable feedback gain and receiving the signal corresponding to the driving voltage, the voltage-controlled amplifier being responsive to the control voltage and the signal corresponding to the driving voltage for generating an output signal and positively feeding back the output signal to the input of the amplifier device to

thereby perform the positive feedback, wherein the voltage-controlled amplifier decreases the variable feedback gain as a level of the control voltage increases, thereby adjusting the amplitude-frequency characteristic of the amplifier device, only if the level of the control voltage exceeds a critical level, and otherwise keeps the variable feedback gain constant as long as the level of the control voltage remains under the critical level.

The Examiner rejected claims 1-4 under 35 U.S.C. §102(b) as being anticipated by the Bonneville reference. In so doing, the Examiner stated "the adders (32, 42), the amplifiers (30, 36, 40), the integrators (34, 38), the sensor (28), the compensation filter (26), and the voltage adjustable amplifier (24) that make up the main feedback loop read on 'a feedback device having a variable feedback gain that performs a positive feedback of a signal corresponding to the driving voltage of the loudspeaker to an input of the amplifier device with variable feedback gain' (col. 3 lines 29-56)"

The Bonneville reference does not disclose, teach, or suggest the audio apparatus specified in independent claim 1, as amended. Unlike the audio apparatus specified in independent claim 1, as amended, the Bonneville reference does not show "a feedback device having a variable feedback gain that performs a **positive feedback of a signal corresponding to the driving voltage of the loudspeaker to an input of the amplifier device** thereby causing the amplifier device to generate a negative impedance effective to negate the internal impedance of the loudspeaker, the feedback device comprising a voltage-controlled amplifier having the variable feedback gain and receiving the signal corresponding to the driving voltage, the voltage-controlled amplifier being responsive to the control voltage and the signal corresponding to the driving voltage for generating an

output signal and positively feeding back the output signal to the input of the amplifier device to thereby perform the positive feedback".

The Bonneville reference teaches the use of "negative feedback" derived by monitoring actual displacement of a loudspeaker's electroacoustic transducer or cone to compensate for transducer non-linearities. For example, the Bonneville reference states "the output of the summing device 32, i.e. **the feedback signal**, comprises three components proportional to acceleration, velocity and position, respectively. This **feedback signal** is applied to a second summing device 42 connected between voltage controlled amplifiers 22 and 24, respectively. The second summing device 42 **subtracts the feedback signal from the audio signal** applied to the input of second voltage controlled amplifier 24 and supplies the **resulting difference signal** to the compensation filter 26 and thence to power amplifier 16. Hence, second voltage controlled amplifier 24 is included in the feedback loop, and controls loop gain, whereas first voltage controlled amplifier 22 precedes the feedback loop and controls the amplitude of the audio signal applied to the input of the feedback loop." (Col. 3, lines 41-55).

The Bonneville reference teaches the use of negative feedback in which the **feedback signal** is applied to a second summing device 42 connected between voltage controlled amplifiers 22 and 24, respectively. The second summing device 42 **subtracts the feedback signal from the audio signal** applied to the input of second voltage controlled amplifier 24 and supplies the resulting difference signal to the compensation filter 26 and thence to power amplifier 16. The power amplifier then drives the speaker 10.

The Bonneville reference further states "First and second gain control signals for **controlling the respective gains of voltage controlled amplifiers 22 and 24**,

respectively, are provided by means of a precision bridge rectifier 44 connected to the output of the second voltage controlled amplifier 24, threshold amplifiers 46 and 48 and charging circuits 50 and 52. The rectifier 44 rectifies the bipolar audio signal to produce a unipolar signal which is applied to respective inputs of first threshold amplifier 46 and second threshold amplifier 48. The outputs of threshold amplifiers 46 and 48 are applied via charging circuits 50 and 52, respectively, to first voltage controlled amplifier 22 and second voltage controlled amplifier 24, respectively. The outputs of charging circuits 50 and 52 are the first and second gain control signals C1 and C2, respectively." (Col. 3, line 57- col. 4, line 1). Essentially, the output of the second voltage controlled amplifier 24, the bipolar audio signal, is feedback (first and second gain control signals C1 and C2) to control the gain of the first voltage controlled amplifier 22 and second voltage controlled amplifier 24. However, the Bonneville reference does not teach positive feedback of a signal corresponding to the driving voltage of the loudspeaker to an input of the amplifier device. The amplifier device of the present invention drives the loudspeaker and is not the voltage controlled amplifier.

The Bonneville reference does not show "a feedback device having a variable feedback gain that performs a positive feedback of a signal corresponding to the driving voltage of the loudspeaker to an input of the amplifier device thereby causing the amplifier device to generate a negative impedance effective to negate the internal impedance of the loudspeaker, the feedback device comprising a voltage-controlled amplifier having the variable feedback gain and receiving the signal corresponding to the driving voltage, the voltage-controlled amplifier being responsive to the control voltage and the signal corresponding to the driving voltage for generating an output signal

and positively feeding back the output signal to the input of the amplifier device to thereby perform the positive feedback". Accordingly, the Applicant respectfully submits that independent claim 1, as amended, distinguishes over the above-cited reference.

Claims 2 and 4 depend directly from independent claim 1, as amended. Therefore, Applicant respectfully submits that claims 2 and 4 distinguish over the above-cited references for the same reasons as set forth above with respect to independent claim 1, as amended.

Applicant believes that the foregoing amendment and remarks place the application in condition for allowance, and a favorable action is respectfully requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the examiner believe that such a telephone conference would advance prosecution of the application.

Respectfully submitted,

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